
NATURE'S

Grapevine

WASHINGTON CROSSING STATE PARK, NJ

Summer 2005

Atmospheric Anomalies: Strangeness in the Sky

by
Jennifer Schwing

Ever see a double rainbow? Do you know what a sundog is? Can you explain what causes a mirage? When we look up into the sky, we think we see a limitless expanse of blue and clouds that stretches beyond forever. In fact, we're looking at a very thin layer of gas that covers the whole planet like a film of plastic wrap around a golf ball. But in that thin wrapper exists a myriad of miracles that dazzles the senses, but can all be explained by science.



Double rainbow (photo by author)

Rainbows

If you've ever used a prism, you've seen white light separated out into the six primary colors. The glass triangle shape allows light in, lets it bounce off an inside surface, and allows it back out, spread out into a rainbow. In the sky, the combination of sunlight and tiny water droplets will create a giant curved

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Hands-on Learning at the Visitor Center/Museum

Historic Resource Interpreters, Clay Craighead and Mark Sirak, have created and incorporated demonstrative learning into their programming at the Museum. This new program addition enables them to teach 4th & 5th grade students the impact of George Washington's fateful crossing of the Delaware River by using a recently purchased reproduction British Musket. After demonstrating the loading and firing of the "Brown Bess", the sound and smoke catches the attention of the children so much that afterward when they come inside and look at the 600 piece collection of Revolutionary War artifacts, they ask many more questions. The second part of the program includes experiential learning where the students become Washington's American army and the teachers are the Hessians in the small town of Trenton. The students march along Continental Lane to the river where they experience the excitement of loading into a reproduction ferry just as Washington's men did. After a discussion of the crossing itself, the students march through the fields, split into two groups, surround the 'town' and then attack the 'teacher' Hessians. One educator wrote back to the Museum that the children were still talking about the "Brown Bess" and the 'attack on the Hessians' days later!

Recently, the Laura Donovan School from Freehold, NJ participated in this expanded program. Excerpts from some of their letters to the Visitor Center follow. This is their impression of the program in their own words. We are glad they had so much fun as well as learned many things. We hope that all of our groups have the same experience:

"Thanks for leading us through the park. It was really a blast. My favorite parts were when we attacked the teachers, and when you shot the musket. I learned a lot from this field trip, but I was having so much fun I didn't even notice it. You guys were really fun and nice. I wish I could go to that beautiful park everyday."

- Marina A.

"The whole trip was like a recap of what we learned in Social Studies class. Just more fun and exciting. All of us were upset to leave." - Jessie

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Hands-On Learning (continued) “I really liked how we got to attack the teachers.... It really made it clear how the continental won over the Hessians after Christmas....” - Stephanie

“I thought it was funny when we were shouting and making noise to distract Clay from firing the Brown Bess musket.” - Melissa L.

“Sitting in the type of ferry that George Washington used was ... cool.” - Jake C.

“I ... liked looking at all the artifacts from the museum. I could not believe that I was looking at the actual letter from George Washington.” - Raquel D

Teachers interested in this program should call the Visitor Center/Museum for further information at (609) 737-9303.



WCSP historic interpreter, Clay Craighead, demonstrates the use of the Brown Bess musket to school children at the Visitor Center.

Volunteer Notes

Lou Beck, Pennington, delivered an outstanding winter birds hike in March.

Pat Chichon, Lambertville, conducted a very interesting spring wild edible and medicinal plants program in May.

Nettie Rekowski, Ewing, and **Priscilla Damiani**, Ewing, have been helping to maintain the Yellow Dot Trail.

The Environmental Club from **Timberlane Middle School** performed some much-needed trail and grounds maintenance one afternoon in April.

Gene Ramsey, Pennington, and several other members of the

Amateur Astronomy Association of Princeton conducted two fascinating solar observation demonstrations on two weekends in May.

Cheryl Burgos, Morrisville, **Terri Miller**, West Trenton, **Netti Rekowski**, Ewing, **Jenny Schwing**, Robbinsville, **Kent Long**, Hopewell Twp., all came in to staff the Nature/Interpretive Center during interpretive events.

Cub Scout Pack 26, Ewing, came out recently to work on restoring some damaged habitat for northern red salamanders.

Sky Anomalies (continued) rainbow that arches as far as you can see. Each little droplet acts as a prism suspended in air, and the colored light from them all combines to create the large rainbow you see, beginning with red, then orange, yellow, green, blue and violet. The rainbow forms a perfect circle in the air, with the bottom half below the horizon, which is why we can only see a half-circle when we're standing on the ground. The further from the ground you are, the more of the rainbow you can see. A double rainbow can be seen when the light beam bounces not once, but twice off the inside surface of the water droplets. The second, fainter rainbow appears 8 degrees above the first one, with the colors reversed.

Sundogs and Halos

A thin uniform layer of clouds very high up in the atmosphere can often contain tiny ice crystals. When light from the sun or a full moon shines through these clouds, a luminous band of light forms in a circle around it, called a halo. If the ice crystals are a certain shape or size, a sun halo can have a very colorful rainbow effect as the white light is separated into its colors. To see a sun halo, it's important to never look straight at the sun, or you can seriously damage your eyes. Stand behind a building or large tree, so that the sun in the center is hidden, and you can look at the ring around it safely. Sundogs, or parhelia, are another phenomenon, or strange event, that occurs when sunlight shines through these tiny ice crystals. When the crystals are all lined up, they can reflect a sort of mirror image of the sun on either side of it. Sundogs usually appear in pairs, one on each side of the sun, and accompany a halo. They are not as bright as the sun, but they are brighter than the halo. They will have red light on the inside, and stretch out away from the sun with yellow and then a blue-white tail.

Mirages

Magicians often use mirrors in their performance to make the audience think they are seeing something that isn't there. At least, the object they're seeing isn't where they think it is. The atmosphere can play tricks on us in the very same way. We can see things because light bounces off of them and then enters our eyes in a straight line.

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This photo shows a sun halo with sundogs framing the halo on each side .

Sky Anomalies Light that bounces off an object can be bent around before it gets to our eyes to make the object look like it's in a different place than it is. The air in the atmosphere close to the ground can bend light when it is warmer or thinner than the air around it. A man in the desert might think he sees a pond of water in the distance, but what he's really seeing is a reflection of blue sky that has been bent to look like it's on the ground. As he walks toward it, the "pond" keeps moving away. What a rotten trick to play on a thirsty man! We see mirages sometimes on hot days, when we're driving along a straight road. The light from the sun above bounces off the hot pavement, and the air right above it can look like a shining puddle of water. But as we get closer, the puddle disappears. It was a mirage.

Clouds

Most people know that clouds are made of tiny droplets of water, or sometimes, tiny ice crystals. But what keeps all that water up in the air? The particles of water in a cloud have formed around tiny grains of dust or salt blowing in the air. They are so miniscule that molecules of air are heavy enough to keep the water bouncing around on top. But with all that bouncing, the droplets run into each other, and combine to make larger droplets. When those drops get big enough, they're too heavy for the air to keep up, and they fall down as rain. The big, fluffy white clouds that hang high in the atmosphere on fair weather days are called cumulus clouds. The sun shines through them and makes them look white. It shines brighter through the thin edges to make the clouds seem like they have a "silver lining." When the water drops are bigger, the sunlight is blocked more and more, and the resulting dark clouds are now storm clouds, getting ready to rain. The very high thin clouds that have ice crystals instead of water droplets are called cirrus clouds. The very low, grey clouds that form a ceiling in the air are called stratus clouds. A foggy day is the result of a stratus cloud that has formed right at ground level. On days like that, you can really say that you have your head in the clouds!

Lightning

The most exciting part of a thunderstorm is lightning, the great bolts of electricity that arc across the sky or sometimes to Earth with a threatening boom of thunder. Why does it happen? Do you ever notice inside in winter when you shuffle along in your sock feet and reach out to touch the cat, that often you both get a shock? (And sometimes a little spark as well!) The friction between your socks and the carpet is causing your body to collect negative ions that are looking for release. At this point, the cat, sitting quietly, has more positive ions than you, and her body readily accepts the jump of negative ions from yours, resulting in a tiny bolt of lightning! The same thing happens during a thunderstorm. Thunderclouds have collected a mass of negatively charged particles that, when concentrated, jump to a positively charged cloud, or to the positively charged ground. A long line of electric fire lights up the sky for a moment. And since light travels faster than sound, you hear the thunder later. Count the seconds between the lightning and thunder; for every 5 seconds, the strike was about one mile away from you.

For Further Reading:

Armentrout, Patricia *Lights in the Sky* /
Rourke Press, c1996.

Capogna, Vera Vullo *Did You Ever Wonder About Things You See in the Sky?* /
.Benchmark Books, 1999.

Gallant, Roy A. *Rainbows, Mirages, and Sundogs : the Sky as a Source of Wonder* .
Macmillan ; Collier Macmillan, c1987

Paul, Richard A *Handbook to the Universe : Explorations of Matter, Energy, Space, and Time for Beginning Scientific Thinkers* /
Chicago Review Press : Distributed by Independent Publishers Group, c1993.

Robinson, Andrew *Earth Shock : Climate, Complexity and the Forces of Nature*
Thames and Hudson, 1993.

Sanders, Ti, *Weather : A User's Guide to the Atmosphere*
Icarus Press, 1985.

Von Baeyer & Hans Christian *Rainbows, Snowflakes, and Quarks : physics and the world around us*
McGraw-Hill, c1984.

Jennifer Schwing is a research librarian at the pharmaceuticals firm, Merck & Co., Inc. She has a bachelor's degree in Biology from Trenton State College, and a Master's in library science from Rutgers. She enjoys watching animals of all kinds in their natural environment. Jenny volunteers frequently at the Nature/Interpretive Center.



Around the Park

❖ Kent Long, Titusville, will be assisting this summer at the Nature/Interpretive Center as a seasonal interpretive specialist. Kent is an environmental science major at East Stroudsburg University.

❖ Dr. Ed Rockel, Newtown, came in this spring to train park staff in cultivating shitake mushrooms. Dr. Rockel helped us set up a small demonstration spawn area on some cut white oak branches in the perennial garden in front of the Nature Center building. If all goes well, we will be looking forward to seeing shitakes growing on the branches this autumn or next and perhaps, some interpretive demonstrations in mushroom cultivation as spring events in the future.

❖ The Johnson Ferry House will be open weekends only this July and August. Please call the Ferry House for further information on their summer schedule at (609) 737-2515.

❖ The Nature/Interpretive Center's observation beehive has undergone some repairs and is cranked up and really humming (literally). Stop by and check out this interesting exhibit.

❖ The AAAP observatory is open for business and is conducting public sky watches on the 1st and last clear Friday evenings of the month during July, August and September. The observatory is accessible via the Phillips Farm (soccer field) entrance to the park off of Bear Tavern Rd. Call the observatory at (609) 737-2515 for further information.

❖ Flooding along the Delaware last September and April put most of the lower sections of WCSP under water but, resulted in only minor damage. We have made a full recovery.

❖ May's annual History Fair was a great success. thousands of visitors came out on a beautiful Saturday afternoon to observe and participate in events sponsored by historic sites and other organizations throughout the state.



Open Air Theatre

Washington Crossing State Park, New Jersey

42ND ANNUAL SUMMER FESTIVAL OF MUSIC AND DRAMA • 2005

Much Ado About NothingJune 9-11, June 16 - 18
By Shakespeare '70

1776.....June 23 - 25, June 29 - 30, July 1 - 2
By Actors Net

Once Upon a Mattress.....July 7 - 9, July 13 - 16
By Playful Theatre

Annie Get Your Gun.....July 21 - 23, July 27 - 30
By Yardley Players

Into the Woods.....Aug 4- 6, Aug 10 - 13
By The Pennington Players

The Wizard of Oz.....Aug 18 - 20, Aug 24 - 27
By Stars in the Park

Curtain Time is 8:00 p.m.

* Note - House will open at 7:30 for general admission *

Box Office opens 6:00 p.m. on performance dates only

(609) 737-1826

Washington Crossing Association of New Jersey

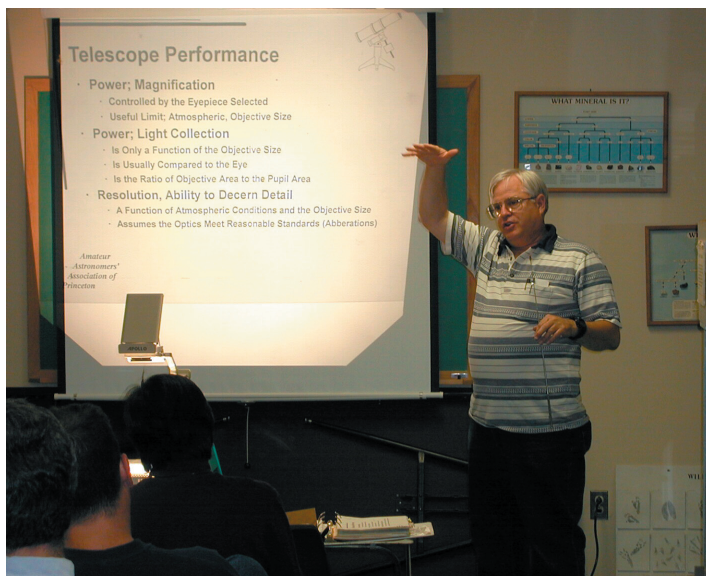
<http://www.oatnj.org>



Astronomy Seminar

"Introduction to Amateur Astronomy" a short course spanning five consecutive Friday evenings will once again be jointly offered by Washington Crossing State Park and the Amateur Astronomers Association of Princeton. The course has been developed with those in mind who have ever gazed with wonder toward the mysterious beauty of the night sky and have pondered the prospects of becoming engaged in this very interesting hobby. The seminar will be taught at the Nature/Interpretive Center starting Friday September 9 at 6:30 p.m. and will continue at 7:30 p.m. on the following four Friday evenings (9/16, 9/23, 9/30, 10/7). The adjacent AAAP Observatory will be utilized on clear nights. Each session will run from 1 1/2 to 2 1/2 hours in length and will be structured for the interest of those at the eighth grade through the adult levels. The instructor will make use of slide presentations, lively discussion, and group activities created to excite the interest of participants. "Introduction to Amateur Astronomy" will be taught by Mr. Victor Belanger of West Windsor, long time amateur astronomer and member of AAAP with over 25 years of professional experience in the aerospace industry.

Enrollment in this course will be limited to about twenty five people and will be available on a first-come, first-served basis. Advanced registration will be required. The cost will be \$5.00 per participant with the charge being applied towards hand-outs and other materials. For further information or to register call the Interpretive Center at (609) 737-0609.



Instructor Vic Belanger delivers a presentation on telescopes during a session in the "Introduction to Amateur Astronomy" seminar in the WCSP Nature/Interpretive Center



Students from a South Jersey middle school help each other over "the wall" on the Nature/Interpretive Center's Group Adventure Experience Course.

Group Programs

The Nature/Interpretive Center recently ended the school year with a busy spring. Hundreds of public and private school students, homeschool students, scouts and 4-H participants, at a variety of grade levels, came out to the facility for outdoor education/nature interpretation. Some group events included trail hikes, animal tracks, shelter building/wilderness survival, wildlife studies, insects, ropes activities, pond and stream studies and ecology activities. We will shortly be scheduling for the fall. A listing of activities is available for teachers, scout and youth group leaders. Give us a call for further information.



Third graders and a parent chaperone show off their collection of natural artifacts from the hardwood forest community during a rainy session of Forest and Field Ecology.



SUMMER PROGRAMS

AT THE NATURE/INTERPRETIVE CENTER

The following is a list of activities being offered through the Interpretive Center at Washington Crossing State Park in Titusville, NJ. Some programs are offered without registration requirements; some will require advanced registration. A fee of \$5.00 per car will be charged to all motor vehicles entering the park for daytime programs on weekends and holidays 5/28 - 9/5 (Memorial Day weekend through Labor Day). Programs will initially meet at the Interpretive Center unless otherwise indicated. Attendance is limited and is available on a first-come, first-served basis. All children must be accompanied by an adult. In the event of inclement weather, some programs might be canceled. It is always advisable to call ahead before coming out. Phone: (609) 737-0609.

NIGHT HIKE (6 yrs. - adult) Friday July 8, 8:30 p.m. Explore the park for nature at night and have some good old fashioned fun on this naturalist-guided hike and campfire. Advanced registration required. Bring a flashlight. Materials charge \$1.00 per participant

NATURAL DYES (all ages) Sunday July 10, 1:30 - 3:30 p.m. Many interesting colors can be derived from plants this time of year. Come out to learn how several of our more common plants can be coaxed to yield dyes for coloring natural fabrics and take home a few samples of your own. Preregistration required. Park vehicle entrance fee applies.

POND STUDY (6 - 10 yr. old) Sunday July 17, 1:30 - 3:00 p.m. Kids will use pond nets to collect and examine the various organisms that inhabit our pond. Meet at the pond by the park service entrance off of Church Road in Titusville. Preregistration required Free.

FAMILY NATURE WALK (all ages) Saturday July 23, 1:00 - 2:00 p.m. An informal naturalist-guided trail walk. Park vehicle entrance fee applies

FAMILY NATURE WALK (all ages) Saturday July 30, 1:00 - 2:00 p.m. An informal naturalist-guided trail walk. Park vehicle entrance fee applies

NIGHT HIKE (6 yrs. - adult) Saturday August 6, 8:30 p.m. Explore the park for nature at night and have some good old fashioned fun on this naturalist-guided hike and campfire. Preregistration required after 7/6. Bring a flashlight. Materials charge \$1.00 per participant.

FAMILY NATURE WALK (all ages) Saturday August 13, 1:30 - 2:30 p.m. An informal naturalist-guided trail walk. Park vehicle entrance fee applies

POND STUDY (6 - 10 yr. old) Sunday August 14, 1:30 - 3:00 p.m. Kids will use pond nets to collect and examine the various organisms that inhabit our pond. Meet at the pond by the park service entrance off of Church Road in Titusville. Advanced registration required after 7/12. Free.

MONARCH MADNESS (all ages) Sunday August 28, 1:30 - 3:00 p.m. The monarch butterfly is a summertime classic here in Washington Crossing State Park. Come out for an introduction to the life cycle of this fascinating insect. We'll show you how to locate monarch eggs and larva and how to build a simple hatchery for raising the creatures. Advanced registration required after 7/26. Park vehicle entrance fee applies. Please Note: Program might be canceled if the butterfly population continues to suffer from disturbances and if its numbers are insufficient in the area.

INTRODUCTION TO AMATEUR ASTRONOMY (13 yrs. - adult) Session I Friday September 9, 6:30 p.m. Through the use of lecture, demonstrations, class exercises and the park observatory, this seminar Friday 9/10 and the following four consecutive Friday evenings, (7:30 p.m. 9/16, 9/23, 9/30, 10/7) will provide the knowledge necessary to become an astronomy hobbyist. The class will be conducted by Vic Belanger of the Amateur Astronomers Association of Princeton. Advanced registration required by 9/9/05. Materials charge: \$5.00 for all five sessions. Call the Interpretive Center for additional information or to register.

Nature Center Programs (continued)

FAMILY NATURE WALK (all ages) Saturday September 10, 1:00 - 2:00 p.m. An informal naturalist-guided trail walk. Park vehicle entrance fee applies

TREES OF THE PARK (adult) Sunday September 18, 1:30 - 3:30 p.m. WCSP is home to scores of species of native trees and shrubs as well as many non-natives that have become naturalized. Join the park naturalist on this walk and learn how to identify many of the most common species. Preregistration required after 8/15. Free.

INDIGENOUS NATIVE AMERICANS OF NEW JERSEY (all ages) Sunday September 25, 1:30 - 2:30 p.m. Jim Wade, former Archivist and Researcher with the N.J. State Museum will discuss the indigenous cultures that inhabited the state before and immediately following European contact. This presentation will focus on the activities of community hunting, village life and autumn religious practices.. The program will include a slide presentation and Native American artifacts. Advanced registration required. Free.

SUMMER PROGRAMS

AT THE VISITOR CENTER/ MUSEUM

Call (609) 737-9303

CROSSING DIORAMA PRESENTATION. Saturday, July 2, 2:00 PM. Visit the Stone Barn opposite the Johnson Ferry House for a Crossing Diorama program. Park vehicle entrance fee applies.

HISTORY VIDEO - "INDEPENDENCE." Monday, July 4, 2:00 PM. This 28 minute video interprets the unfolding drama of the struggle for Independence by our Founding Fathers including Benjamin Franklin, George Washington and Thomas Jefferson. Park vehicle entrance fee applies.

CROSSING DIORAMA PRESENTATION. Sunday, August 7, 2:00 PM. Visit the Stone Barn opposite the Johnson Ferry House for a Crossing Diorama program. Park vehicle entrance fee applies.

CANNON FIRING DEMONSTRATION! Saturday, August 13, 11:00 AM - 4:00 PM. Lamb's Artillery Company & Daniel Morgan's Rifle Company will be conducting artillery and rifle demonstrations throughout the day. Park vehicle entrance fee applies.

HISTORY VIDEO - "JAMESTOWN REDISCOVERY." Saturday, September 3, 2:00 PM. Thought to have disappeared by erosion into the James River the discovery of the Jamestown Fort is considered to be one of the major archaeological finds of the 20th century. Park vehicle entrance fee applies.

COLONIAL LIVING HISTORY ALLIANCE ENCAMPMENT. Saturday, September 3 & Sunday September 4, 10:00 AM - 4:00 PM. Visitors can enjoy and learn about 18th century colonial life through civilian eyes by visiting this colonial encampment. Park vehicle entrance fee applies.

HISTORY VIDEO "DISCOVER NEW JERSEY: REVOLUTIONARY TRAVELS." Monday, September 5, 2:00 PM. A 30 minute video takes you on a tour of several New Jersey historic sites. Park vehicle entrance fee applies.

HISTORY VIDEO "DOORWAY TO THE PAST." Saturday, September 10, 2:00 PM. This 30 minute video demonstrates how archaeologists determine what occurred in the past by what they find buried in Colonial Williamsburg.

HISTORY VIDEO - "SEARCH FOR A CENTURY: THE DISCOVERY OF MARTIN'S HUNDRED PLANTATION." Saturday, September 17, 2:00 PM. This fascinating 60 minute documentary is a chronological account of the archaeological discoveries on the site of a seventeenth-century plantation.

NEW JERSEY FRONTIER GUARD ENCAMPMENT. Saturday, September 24 & Sunday September 25, 10:00 AM - 4:00 PM. Visitors can enjoy an 18th century encampment by New Jersey's colonial militia, which defended the western settlements of Sussex County prior to the American Revolution. The arts and crafts of frontier life and defense can be observed throughout the day.



New Jersey Department of Environmental Protection



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Titusville, New Jersey 08560-1617

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NATURE'S *Grapevine*

Nature's Grapevine is produced quarterly by:



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